REMARKS

Claims 1-10 are currently pending. Reexamination and reconsideration of the present application is respectfully requested. The Examiner's Office Action dated June 20, 2003 has been received and the contents carefully noted.

The Examiner objected to the drawings because the reference sign 16A mentioned in the specification is not shown. Applicants have amended Fig. 1 to include reference sign 16A. Applicants respectfully request withdrawal of the objection to the drawings.

The Examiner rejected claims 1-4 and 8-10 under 35 USC 103(a) as being unpatentable over Kikuchi (US Patent No. 6,452,665) in view of Ikebuchi (US Patent No. 5,831,717). This rejection is respectfully traversed.

Claim 1 is allowable at least for the reason that claim 1 recites a combination of features including, for example,

> "...second driving means for, before the first driving means drives the electromagnetic wave generating means, driving the electromagnetic wave generating means and thereby causing the electromagnetic wave generating means to generate and transmit a judgment electromagnetic wave having an energy smaller than that of the distance measurement electromagnetic wave..."

Claim 2 is allowable at least for the reason that claim 2 recites a combination of features including, for example,

> "...second driving means for, before the driving means drives the electromagnetic wave generating means, driving the electromagnetic wave generating means and thereby causing the electromagnetic wave generating means to generate and transmit a judgment electromagnetic wave having an energy smaller than that of the distance measurement electromagnetic wave..."

Claim 9 is allowable at least for the reason that claim 9 recites a combination of features including, for example,

> "...third means for determining whether or not the second means receives an echo corresponding to the first laser beam; fourth means for emitting a

> second laser beam in the first direction in cases where the third means have determined that the second means receives an echo corresponding to the first laser beam, the second laser beam having a second power; fifth means for emitting a third laser beam in the first direction in cases where the third means have determined that the second means does not receive an echo corresponding to the first laser beam, the third laser beam having a third power, the third power being higher than the first power, the third power being higher than the second power..."

Claim 10 is allowable at least for the reason that claim 10 recites a combination of features including, for example,

> "...fourth means for emitting a second laser beam in the first direction in cases where the third means have determined that the second means does not receive an echo corresponding to the first laser beam, the second laser beam having a second power higher than the first power..."

None of the cited references singly or in combination teaches or suggests at least these features of the claims.

In the present invention, a distance measurement apparatus transmits an electromagnetic wave beam such as a laser beam, receives an echo, calculates the time interval between the moment of the transmission of the beam and the moment of the reception of the echo, and measures, from the calculated time interval, the distance to an object reflecting the beam and causing the echo. *See* Specification at page 1, paragraph beginning on line 5.

Kikuchi discloses an object detecting system including a light transmitting section 1, a scanning section 2, a light receiving section 3, a light receiving and scanning section 4, a laser diode driving circuit 12, a counting circuit 27, and a central calculating and processing unit 28. On page 3 of the Office Action, the Examiner states that Kikuchi does not teach a second driving means and cited Ikebuchi to cure the deficiencies of Kikuchi.

Ikebuchi teaches an obstacle detecting apparatus including a light transmitting device 1 and driving voltage control circuits 11a-11n. H1 is a lower limit of an objective

related to the level of the received light signal, which is higher than L (the threshold value), and H2 is an upper limit of the objective related to the level of the received light signal. When the level of the received light signal exceeds the upper limit H2, the intensity of the light subsequently transmitted from the same laser diode in the same direction is reduced. When the received light signal does not exceed the lower limit H1, the intensity of the light transmitted from the same laser diode in the same direction a subsequent time is increased. In the first embodiment, the power of the transmitted light is controlled such that a peak value of the received light signal waveform is within a range defined by H1 and H2. See column 4, line 50 to column 5, line 20.

In contrast, in the present invention, a set of a preliminary emission of the laser light and a main emission thereof is executed for each of the directions (the angular directions) D1-DN of the transmission of the forward pulse laser beam which form the detection area. Thus, a set of a preliminary emission of the laser light and a main emission thereof is repetitively executed a plurality of times during every cycle or period of the motor drive signal outputted from the microcomputer 90 to the motor drive circuit 18, that is, during every period of the scanning of the detection area by the forward pulse laser beam. See page 22, lines 12-23, page 28, lines 8-20, page 33, lines 7-19.

Since a set of a preliminary emission of the laser light and a main emission thereof is executed for each of the directions (the angular directions) D1-DN of the transmission of the forward pulse laser beam which form the detection area, the timing difference between the preliminary emission and the main emission in the set is relatively small. The small timing difference results in a good response characteristic of the apparatus of FIG. 1. In other words, the power of the forward pulse laser beam can be changed between a low level

and a normal level (that is, the measurable distance can be changed between a short value and a normal value) in such a way as to provide a good response characteristic of the apparatus of FIG. 1. See page 23, lines 10-22.

Ikebuchi attempts to ensure that the transmitted light power is sufficient to detect an obstacle at a long distance. The distance to the object is based on the time difference between transmission of the light and reception of the reflected light, and the power of the transmitted light is controlled such that reception intensity of the reflected light in every angular direction can be within a predetermined range. See Abstract.

The steps 110 and 120 in FIG. 3 of the present invention correspond to a second driving means. The driving voltage circuits 11a-11n of Ikebuchi are different from the second driving means of the present invention for at least the reason that a transmission wave having a small energy is generated by the second driving means to implement the preliminary distance measurement. There is no description in the references of a second driving means for, before the first driving means drives the electromagnetic wave generating means, driving the electromagnetic wave generating means and thereby causing the electromagnetic wave generating means to generate and transmit a judgment electromagnetic wave having an energy smaller than that of the distance measurement electromagnetic wave as recited in claims 1 and 2.

Further, there is no description in the references of determining whether or not an echo corresponding to a first laser beam having a first power has been received; a second laser beam where it has been determined that an echo has been received corresponding to the first laser beam, the second laser beam having a second power; a third laser beam in the where it has been determined that an echo corresponding to the first laser beam has not

been received, the third laser beam having a third power, the third power being higher than the first power, the third power being higher than the second power as recited in claim 9.

Furthermore, there is no description in the references of a second laser beam where it has been determined that an echo corresponding to first laser beam has not been received, the second laser beam having a second power higher than the first power.

As discussed above, Ikebuchi does not generate a preliminary emission of a first distance measurement beam having a power smaller than emissions of second and subsequent beams as recited in claims 9 and 10.

It can thus be understood that the combination of references do not in any way make obvious the essential features of the present invention as set out in independent claims 1, 2, 9, and 10.

Moreover, as claims 3, 4, and 8 each depend from independent claim 2, each of these claims is also allowable for the same reasons as their respective base claim.

As the cited references fail to make obvious the present invention as recited in claims 1-4 and 8-10, Applicants respectfully request that the rejection of claim 1-4 and 8-10 under 35 USC 103(a) be withdrawn.

The Examiner rejected claims 5-7 under 35 USC 103(a) as being unpatentable over Kikuchi in view of Ikebuchi as applied to claims 1-4 and 8-10 above, and further in view of Nagazumi (US Patent No. 6,381,261). This rejection is respectfully traversed.

On pages 4 and 5 of the Office Action, the Examiner states that the combination of Kikuchi in view of Ikebuchi does not teach specifically that the generating means generates the electromagnetic waves in the form of pulses. The Examiner cites Nagazumi in an attempt to cure the deficiencies of the other two references.

Nagazumi teaches a random pulse type radar apparatus including two kinds of modulations which are phase shift keying (PSK) modulation for selecting a phase of a transmission radio wave in accordance with a pseudo noise digital code and outputting the transmission wave, and time hopping modulation for stopping transmission of a radio wave at random in accordance with the pseudo noise digital code.

In the present invention, one pulse of the laser light is generated by a preliminary emission. With reference to FIG. 10, the transmission signal of the P-bit pseudo noise code (for example, the 127-chip maximum length code) is outputted from the signal generation circuit 40 and hence a corresponding plurality of pulses of the laser light are sequentially generated by a main emission procedure in the case where an object is not detected as a result of the immediately-preceding preliminary emission. On the other hand, the transmission signal of the Q-bit pseudo noise code (for example, the 15-chip maximum length code) is outputted from the signal generation circuit 40 and hence a corresponding plurality of pulses of the laser light are sequentially generated by a main emission procedure in the case where an object is detected as a result of the immediately-preceding preliminary emission. See page 36, paragraph beginning on line 22.

Nagazumi fails to cure the deficiencies of the other references because there is no description of a second driving means generating a preliminary distance measurement wave having a small energy than a main emission wave as recited in claim 2.

It can thus be understood that the combination of references do not in any way make obvious the essential features of the present invention as set out in independent claim 2.

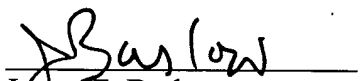
Moreover, as claims 5-7 depend from independent claim 2, each of these claims are

also allowable for the same reasons as their respective base claim.

As the combination of references fails to make obvious the present invention as recited in claim 5-7, Applicants respectfully request that the rejection of claims 5-7 under 35 USC 103(a) be withdrawn.

In view of the above remarks, the present application is believed to be in condition for allowance. A prompt notice to that effect is respectfully requested. Although no additional fees are believed to be due, permission is hereby given to charge any unforeseen fees to deposit account 50-1147.

Respectfully submitted,



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